School of Systems and Enterprises
Stevens Institute of Technology
Castle Point on Hudson
Hoboken, NJ 07030

Syllabus 2008

EM 605 Operations Research

PURPOSE: This memorandum provides each student the administrative details and guidance necessary to successfully complete EM 605.

TEXT: Management Science & Decision Technology, J.Camm & J.Evans, S-W College Publishing, 2001

SOFTWARE: Excel add-ins: Solver, Crystal Ball, Treeplan, OptQuest.

COURSE DESCRIPTION:
This course will provide an understanding of history and latest development of Operations Research (OR) tools and models. The students will be exposed to the process of system approach to design and development of OR models. The students will also be exposed to the formulation of requirements to data collection and software for forecasting, optimization and simulation of business processes. The course will focus on the use of tools and the development of models from case studies.

COURSE OBJECTIVES: This purpose of this course is to provide the students with the following capabilities:
Objective 1: Organizational principles and practice of Operation Research approach to management problems.
Objective 2: Formalization of case studies in conceptual, algorithmic and mathematical models.
Objective 3: To apply modern software packages to conduct analysis of real world data.
Objective 4 Application of analytical techniques and sensitivity analysis to solved problems and data sets.
Objective 5: To summarize and present the analysis results in a clear and coherent manner.

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STUDENT PERFORMANCE ASSESSMENT:

Graded events	Quantity	Percentage
Class exercises	6*5=30	30
Homeworks	5*10=50	50
Course project	20	20
Total	100 points	100%

Exercises, Homeworks and Project

Class exercises reports should be submitted during the class time. Project and homeworks are scheduled for submission on the dates shown on the "Lesson Schedule." Prior approval must be received for late submissions.

Re-grading

If you would like to submit a homework assignment, exam, or project for re-grading, please do not write anything on your paper before you resubmit it. Instead, simply attach a sheet of paper listing the problem numbers you would like to be regarded and what your issues are with the grading. **You must submit your concerns in writing in order for a problem or project to be re-graded.**

GRADING AND CRITERIA FOR PASSING:

(1) Turn in all written material (see Lesson Schedule).
(2) Final grades will be awarded in accordance with the following scale:

Grade	Percentage
A	90 - 100
B	80 - 89
C	70 - 79
F	<70

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Schedule for EM 605 Operations Research

Class No.	Topic	Reading	Assignments
1	Overview of Course o Review of Operations Research history o OR Process, Methods and Models o Engineering Cost Estimation o Decision Technology software o Design/Development of OR Models o Case Study and Team Projects	Chapter 1 PPT slides	Wikipedia search on Operations Research
2	Data Management and Analysis o Contemporary Data Mining Approach o Application of Flow Diagrams o Data Visualization o Correlation and Structural Analysis	Chapter 2 Class exercise 1 PPT Slides	
3	Forecasting o Review of Methods o Quantitative Versus Qualitative Forecasts Forecasting software o Causal Models o Case Studies	Chapter 3 Class exercise 2 PPT Slides	Homework 1
4	Linear Optimization o Analytical Models o Linear Programming o Sensitivity Analysis of Parameters o Engineering and Management Applications o Case Studies	Chapter 4 Class exercise 3 PPT Slides	Homework 2
5	Nonlinear Optimization o Design of Model o Applications to Management o Requirements to Function Shape o Case Studies	Chapter 5 Class exercise 4 PPT Slides	Homework 3
6	Integer Optimization o Model Development o Estimating Techniques o Solution Methods and Software o Case Studies	Chapter 5 Class exercise 5 PPT Slides	Homework 4
	Test 1	**Chapters 2-5**	
7	Decision and Risk Analysis o Overview of Uncertainty o Decision Strategies o Case Studies	Chapter 6 Class exercise 6 PPT Slides	Project Proposal presentations
8	Systems Simulation Introduction to Simulation o Simulation Using Spreadsheets o Process Generators o Case Studies	Chapter 7 Crystal Ball Software	Homework 5

	Topic		
9	Systems Modeling o Definitions of Systems o Dynamic of Systems Parameters o System Dynamics o Case Study	Chapter 8 PPT Slides	
10	Waiting Lines Modeling o Technology of Modeling o Waiting Lines and System Standards o Cost and Time criteria of Optimization o FCS Case Study	Chapter 8 PPT Slides	Project PPT slides
12	System Simulation Software o Monte Carlo Simulation o System Dynamics o Discrete Events Simulation o Other tools: Activity Based, Process, etc. o Integration of Simulation and Optimization	Chapter 8 PPT Slides	Project Presentations
13	Business Cases Analysis o Engineering o Life Cycle Forecasts o Supply Chain Optimization o Economic Perspectives o Global Environmental Problems	Class Slides	Project Presentations
	Test 2	**Chapters 6-8**	
14	Summary and Course Review		**Project Report**